Medical Xpress

Executive function tests key to early detection of Alzheimer's

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By the time older adults are diagnosed with Alzheimer's disease, the brain damage is irreparable. For now, modern medicine is able to slow the progression of the disease but is incapable of reversing it. What if there was a way to detect if someone is on the path to Alzheimer's before substantial and non-reversible brain damage sets in?

This was the question Erin K. Johns, a doctoral student in Concordia University's Department of Psychology and member of the Center for Research in Human Development (CRDH), asked when she started her research on older adults with mild cognitive impairment (MCI). These adults show slight impairments in memory, as well as in "executive functions" like attention, planning, and problem solving. While the impairments are mild, adults with MCI have a high risk of developing Alzheimer's disease.

"We wanted to help provide more reliable tools to identify people who are at increased risk for developing Alzheimer's so that they can be targeted for preventive strategies that would stop brain damage from progressing," says Johns.

The new study was published in the *Journal of the International Neuropsychological Society* and was funded by the Quebec Network for Research on Aging and the Canadian Institutes of Health Research. In it, Johns and her colleagues found that people with MCI are impaired in several aspects of executive functioning, the biggest being inhibitory control.

This ability is crucial for self-control: everything from resisting buying a candy bar at the checkout aisle to resisting the urge to mention the obvious weight gain in a relative you haven't seen in a while. Adults with MCI also had trouble with tests that measure the ability to plan and organize.

Johns and her colleagues found that all the adults with MCI they tested were impaired in at least one executive function and almost half performed poorly in all the executive function tests. This is in sharp contrast with standard screening tests and clinical interviews, which detected impairments in only 15 percent of those with MCI.

"The problem is that patients and their families have difficulty reporting executive functioning problems to their physician, because they may not have a good understanding of what these problems look like in their everyday life." says Johns. "That's why neuropsychological testing is important."

Executive function deficits affect a person's everyday life and their ability to plan and organize their activities. Even something as easy as running errands and figuring out whether to go to the drycleaners or to the supermarket can be difficult for adults with MCI. Detecting these problems early could improve patient care and treatment planning.

"If we miss the deficits, we miss out on an opportunity to intervene with the patient and the family to help them know what to expect and how to cope," says Johns. She is now conducting a follow-up study funded by the Alzheimer Society of Canada and Canadian Institutes of Health Research, along with her supervisor, Natalie Phillips, associate professor in the Department of Psychology and member of CRDH.

Johns hopes her continued research will lead to a better understanding of why these deficits start at such an early stage of Alzheimer's and what

other tools could be used for earlier detection of the disease.

Rewarding research: In recognition of the excellence of this research, Johns was awarded the Canadian Institutes of Health Research Institute of Aging Age+ Prize.

Provided by Concordia University